A419 Series Electronic Temperature Controls with Display and NEMA 1 or NEMA 4X Watertight Enclosures

The A419 series controls are single-stage, electronic temperature controls with a Single-Pole, Double-Throw (SPDT) output relay. They feature a lockable front-panel touchpad for setup and adjustment, and a Liquid Crystal Display (LCD) for viewing the temperature and status of other functions. A Light-Emitting Diode (LED) indicates the controls' output relay On/Off status. The A419 controls are available in 24 VAC or 120/240 VAC powered models.

The A419 controls have heating and cooling modes, adjustable setpoint and differential, an adjustable anti-short cycle delay, and a temperature offset function. The setpoint range is -30 to 212°F (-34 to 100°C). The controls feature remote sensing capability and interchangeable sensors. The A419 controls are available in either NEMA 1, high-impact plastic enclosure suitable for surface or DIN rail mounting or NEMA 4X watertight, corrosion-resistant surface-mount enclosures.

Figure 1: A419 Temperature Control with NEMA 1 Enclosure and A99 Temperature Sensor

Features and Benefits	
Easy-to-Read Front-Panel Liquid Crystal Display	Displays the sensed temperature and control-function status clearly; custom icons on the display indicate the control and system status at a glance
Wide Temperature Differential Adjustment Range (1 to 30F° or C°)	Allows the user to set a precise (1F° or C°) temperature differential from 1 to 30F° or C°; providing a much tighter differential than electromechanical controls
Adjustable Anti-Short Cycle Delay (0 to 12 Minutes in 1-Minute Increments)	Ensures that the output relay remains off for a user-set time delay, which helps avoid hard starts, nuisance overload outages, and unnecessary equipment wear
Switch-Activated Temperature Offset Function	Allows the user to shift the cut-in and cutout setpoints by an adjustable offset based on the status of a user-installed, external switch, such as a time clock
High-Impact, Thermoplastic NEMA 1 or NEMA 4X Watertight, Corrosion-Resistant Enclosures	Increase application options, allowing surface and snap-fit DIN rail mount, or Watertight surface mount
Lockable Front Panel Touchpad	Allows easy set up and adjustment of the A419 control setpoint, differential, and other functions; a concealed jumper locks the touchpad, and deters unauthorized adjustment of the control settings
Low- and Line-Voltage Models	Provide options for most refrigeration and HVAC control-voltage applications

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Application

IMPORTANT: The A419 Series Temperature Controls are intended to control equipment under normal operating conditions. Where failure or malfunction of an A419 Series Control could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices (limit or safety controls) or systems (alarm or supervisory) intended to warn of or protect against failure or malfunction of the A419 Series Control must be incorporated into and maintained as part of the control system.

The A419 Electronic Temperature Control can be used to control a wide variety of single-stage refrigeration or Heating Ventilating, and Air Conditioning (HVAC) equipment. Typical applications include:

- retail store display freezers and reach-in coolers
- supermarket display cases for produce/meats
- retail store walk-in coolers and freezers
- boiler operating control (used as a thermostat)
- condenser fan cycling or staging
- cooling tower pump and fan control
- space and return air temperature control

FCC Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

Canadian Compliance Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Dimensions

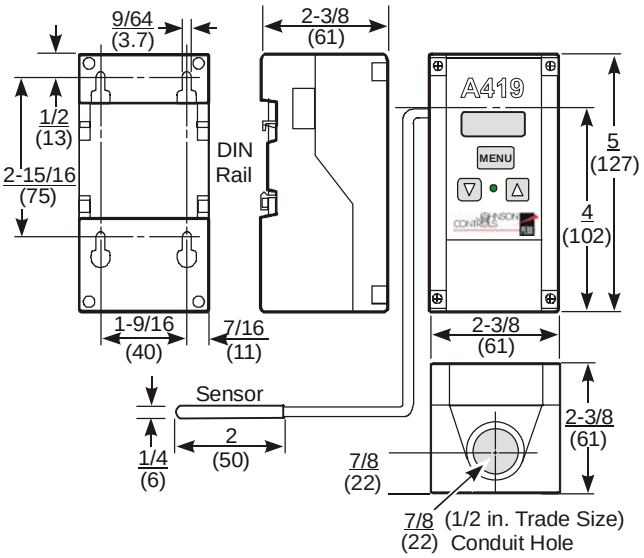


Figure 2: A419 Temperature Control with NEMA 1 Enclosure, Dimensions, in./(mm)

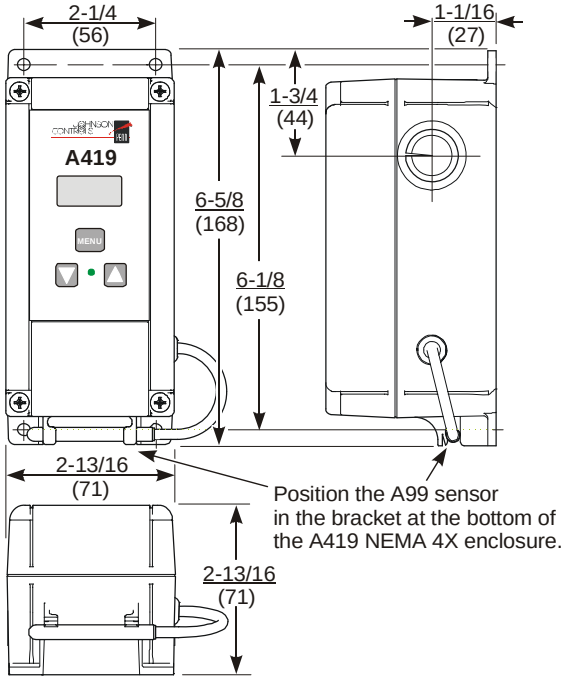


Figure 3: A419 Temperature Control with NEMA 4X Watertight, Corrosion-resistant, Enclosure, Dimensions, in./(mm)

Figure 4: A419 Temperature Control with NEMA 4X Enclosure and A99 Temperature Sensor

Operation Overview

The A419 control's front-panel, LCD, LED, and the A419 control functions are described below. See the *Adjustments* section for instructions on setting up and adjusting the A419 control.

A419 Control Front-Panel

The front panel of the A419 control has a three-button touchpad and LCD for adjusting control function values, and an LED indicator that displays the On/Off status of the SPDT output relay. See Figure 5.

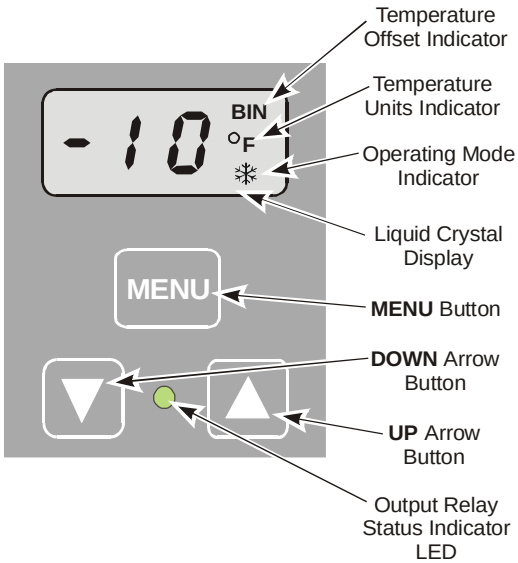


Figure 5: A419 Control Front-Panel with Display

Liquid Crystal Display

During normal operation, the LCD displays the temperature at the sensor, the units of temperature (°***F*** or °***C***), and an icon indicating if the control is set for Heating (🔥) or Cooling (❄) mode. The LCD also displays ***BIN*** if the Temperature Offset function is activated. See Figure 5.

During control set up or adjustment, the LCD displays the control functions and their values (settings). After 30 seconds of inactivity, the display returns to the sensed-temperature display. See the *Adjustments* section to adjust the control setting.

Output Relay Status Indicator LED

A green LED on the control's front panel illuminates when the SPDT output relay is energized and the Normally Open (N.O.) contacts are closed. See Figure 5.

A419 Control Definitions

Cut-in is the temperature at which the N.O. contacts on the SPDT output relay close.

Cutout is the temperature at which the N.O contacts on the SPDT output relay open.

A419 Functions Set at the Front-Panel

Setpoint (***SP***) establishes the temperature value that energizes or de-energizes the output relay, depending on the user selected mode of operation. The control may be set either to cut in or to cut out at Setpoint. See the *Cooling/Heating and Setpoint Modes*. The Setpoint range is -30 to 212°F (-34 to 100°C).

If Setpoint mode is **Cut-in**, Setpoint is the temperature value that closes the N.O. contacts. If Setpoint mode is **Cutout**, Setpoint is the temperature value that opens the N.O. contacts. See Figure 7 and Figure 8.

Differential (***dIF***) establishes the difference in temperature (in F° or C°) between the cut-in and cutout values. The differential is set relative to Setpoint and may be set from 1 to 30F° or C°. See Figure 7 and Figure 8.

Anti-Short Cycle Delay (***ASd***) establishes the **minimum** time that the N.O. contacts remains open (after reaching cutout) before closing again. The delay overrides any Load Demand and does not allow the N.O. contacts to close until the set time-delay value has elapsed. See Figure 6. When the delay is activated, the LCD alternately flashes the sensor temperature and ***ASd***. The delay may be set for 0 to 12 minutes in 1-minute increments.

For example, if the anti-short cycle delay is set for 7 minutes, the A419 control will not restart the equipment for 7 minutes after the equipment has cut out, even if the cut-in temperature value is reached during the delay. If the temperature reaches the cut-in value during the delay period, the display flashes between the sensed temperature and ***ASd***, indicating that the next On-cycle is being delayed. After the set delay time has elapsed, the A419 control returns to normal operation, restarts the equipment (if cut-in has been reached), ***ASd*** stops flashing, and the LCD reverts to the normal operating display.

Note: Any interruption in supply power to the A419 control activates the anti-short cycle delay.

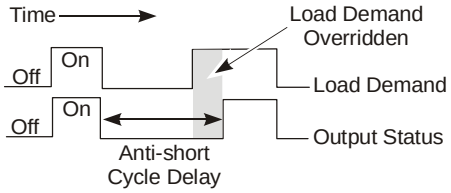


Figure 6: Anti-short Cycle Delay

Sensor Failure Operation (***SF***) establishes how the A419 control operates the equipment in the event of a sensor or sensor-wiring failure. The A419 control may be set to run the equipment continuously or to shut it down if the sensor or sensor wire fails. When a failure is detected the LCD flashes ***SF*** alternately with ***OP*** if the sensor circuit is **open**, or ***SF*** and ***SH*** if the sensor circuit is **shorted**. The control implements a 1-minute delay before initiating a failure response to allow for verification of the failure condition and to avoid nuisance failure indications.

Temperature Units establishes the units of temperature (F° or C°) displayed on the LCD.

Temperature Offset (***OFS***) establishes the value of setpoint-shift (in F° or C°) applied to Setpoint (and Differential) when a (user-installed) circuit is closed between the binary input (**BIN**) and common (**COM**) terminals. The offset value may be set from 0 to 50F° or C°.

The **Temperature Offset** function is used to reset the Heating Setpoint to a lower temperature (secondary) setpoint or reset the Cooling Setpoint to a higher temperature (secondary) setpoint by the temperature value set in Temperature Offset.

The **BIN** and **COM** terminals may be connected to a (user-supplied) external switching device, such as a time clock, that has a set of Single-Pole, Single-Throw (SPST) contacts. Closing a circuit between the **BIN** and **COM** terminals activates the Temperature Offset. See *Wiring*.

This function enables the control to alternate between two temperature setpoints based on the position of the binary input switch. The difference between the primary and secondary setpoints (in F° or C°) is set in the Temperature Offset function (***OFS***) using the touchpad. See *Setting Other Functions*.

Table 1 shows an example of Temperature Offset.

Table 1: Temperature Offset Example

Mode of Operation	Setpoint	Temperature Offset Value	Secondary Setpoint*
Cooling	70°	8°	78°
Heating	70°	8°	62°

* Setpoint when circuit between binary input terminals (BIN and COM) is closed

When the circuit is closed between the binary input (**BIN**) common (**COM**) terminals, the offset function is enabled and the A419 control cycles on the secondary setpoints. ***BIN*** is displayed on the LCD above the °***F*** or °***C*** symbol when the offset is enabled. See Figure 5.

A419 Control Functions Set by Jumper Position

For instructions on positioning jumpers, see *Positioning the Jumpers* in the *Adjustments* section. Refer to Figure 12 and Figure 13.

Touchpad Lock: The jumper at P5 establishes whether the touchpad is locked or unlocked. Locking the touchpad deters accidental or unauthorized changes to all of the function parameters.

Heating/Cooling Mode is established by positioning the jumper on the top two pins of the P4 jumper. See Figure 13.

Setpoint Mode: Removing or installing the lower jumper at P4 establishes whether Setpoint is the cut-in temperature or cutout temperature. See Figure 13.

Cooling/Heating and Setpoint Modes

The A419 control may be in four operating modes: **Cooling/Cut-in**, **Cooling/Cutout**, **Heating/Cut-in**, and **Heating/Cutout**. Position the jumpers located on the circuit board under the A419 control cover to set the desired mode of operation. See *Positioning the Jumpers*.

In **Cooling/Cut-in mode** the differential is below Setpoint. The output relay energizes and the LED illuminates when the temperature rises to Setpoint. When the temperature drops to Setpoint *minus* the differential value, the relay and LED de-energize.

In **Cooling/Cutout mode** the differential is above Setpoint. The output relay energizes and LED illuminates when the temperature rises to Setpoint *plus* the differential value. When the temperature drops to Setpoint, the relay and LED de-energize.

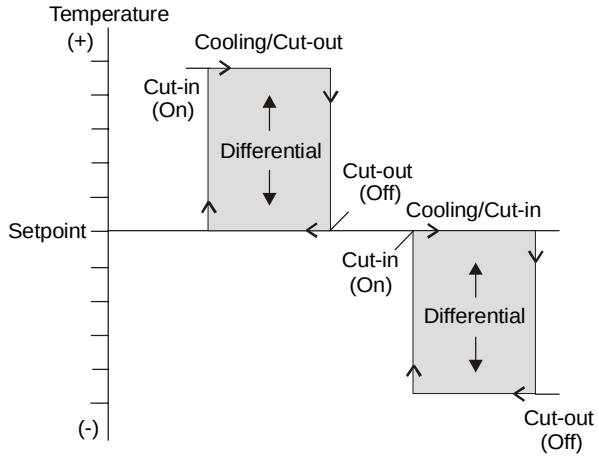


Figure 7: Cooling Modes

When the **Heating/Cut-in mode** is selected, the differential is above Setpoint. The output relay energizes and LED indicator illuminates when the temperature drops to Setpoint. When the temperature rises to Setpoint *plus* the differential value, the output relay and LED de-energize.

When **Heating/Cutout mode** is selected, the differential is below Setpoint. The output relay energizes and LED indicator illuminates when the temperature drops to Setpoint *minus* the differential value. When the temperature rises to Setpoint, the output relay and LED indicator de-energize.

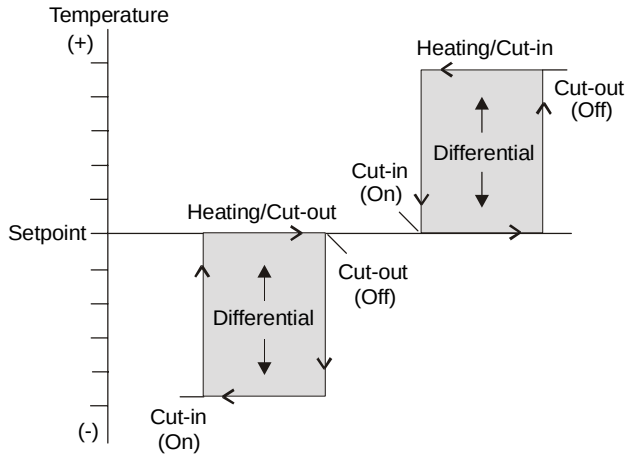


Figure 8: Heating Modes

Mounting

An A419 control has either a standard high-impact plastic NEMA 1 or a NEMA 4X corrosion-resistant, watertight enclosure.

The A419 control is not position sensitive but should be mounted for convenient wiring and adjustment.

Note: When mounting the control to rigid conduit, attach the hub to the conduit before securing the hub to the control enclosure.

The mounting hole pattern of the NEMA 1 enclosure is identical to that of the System 350™ controls, and most models of the A19 control. The NEMA 1 enclosure may also be mounted on 35 mm DIN rail. See Figure 1 and Figure 2.

The NEMA 4X models may be mounted to flat vertical surfaces using the four screw holes at the enclosure corners. See Figure 3 and Figure 4. To maintain the watertight and corrosion resistant integrity of the NEMA 4X enclosure, use a conduit fitting rated for the environment in which the control is installed.

An additional (low-voltage) two-wire cable is required to operate the temperature offset function. On NEMA 4X enclosures you must install a suitable liquid-tight fitting in an available knockout to pass the two-wire cable through the enclosure wall.

IMPORTANT: The short-lead A99 sensor, included with A419 NEMA 4X model controls, must be mounted on the bottom of the control in the bracket molded on the NEMA 4X housing. Mounting the sensor on top of the control may reduce the accuracy of the displayed temperature. See Figure 3 and Figure 4 for proper sensor position.

Wiring

WARNING: Risk of Electrical Shock.
To avoid the risk of electrical shock, disconnect all power sources to the control before wiring any connections. More than one disconnect may be required to completely de-energize the control and equipment.

IMPORTANT: All wiring must conform to local, national, and regional regulations. Use copper conductors only for all wire connections. Do not exceed the electrical ratings for the A419 control or the equipment it is wired to.

Refer to Figure 9, Figure 10, and Figure 11 for typical examples of wiring an A419 control to the controlled equipment.

Use wire no larger than 12 AWG when connecting to the two lower terminal blocks (**TB1** and **TB2**).

Note: Terminal block TB2 is an isolated SPDT switch (dry contacts). The TB2 terminals have no internal electrical connection to the A419 control.

Use wire no larger than 16 AWG when connecting to the upper sensor terminal block (**TB3**).

Wire insulation rating must be 90°C, minimum.

A99 temperature sensors are not polarity sensitive. Wire the leads to (+) **SEN** and (-) **COM** on the sensor terminal block (**TB3**). See Figure 9, Figure 10, and Figure 11.

Keep the leads between the control and sensor as short as possible/practical in your application. The additional resistance in long sensor leads creates error between the actual temperature and the displayed temperature. Refer to Table 1 when extending sensor leads.

Temperature sensor signals may be affected by electrical interference. When extending sensor cable beyond 50 ft (15.2 m) use a twisted-pair, shielded cable to reduce electrical interference.

If the **Temperature Offset** function is used, wire a switch (such as a switching time clock) between the binary input terminal (**BIN**) and the common terminal (**COM**). See Figure 9, Figure 10, and Figure 11 for terminal strip location.

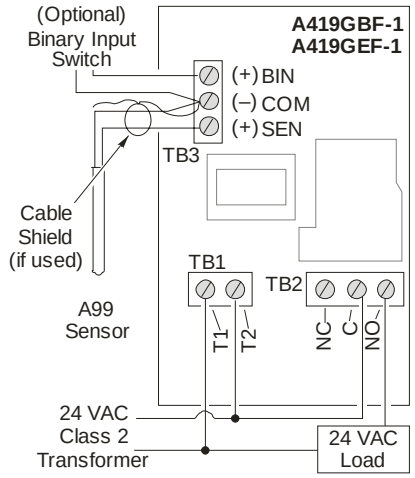


Figure 9: Wiring the 24 VAC A419 Control

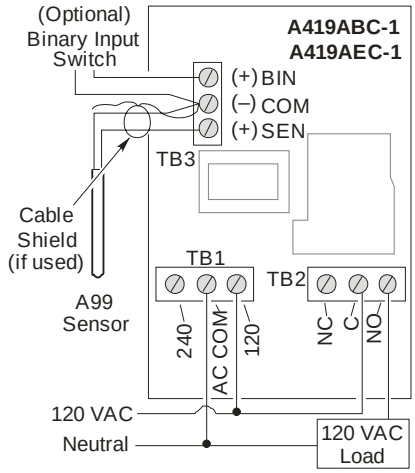


Figure 10: Wiring the 120 VAC A419 Control

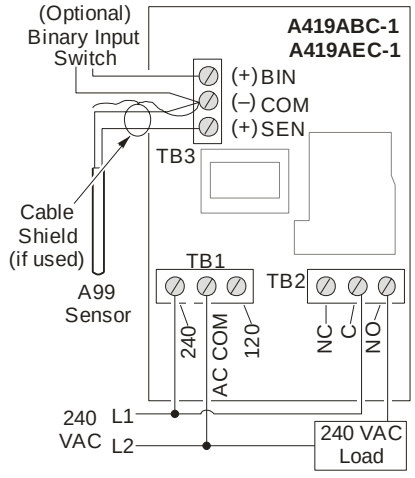


Figure 11: Wiring the 240 VAC A419 Control

Adjustments

This section provides instructions for setting up and adjusting the A419 controls using the jumpers and touchpad.

Positioning the Jumpers

The P5 Jumper Pin Block has a single set of jumper pins and is used to lock or unlock the touchpad. The P4 Jumper Pin Block has two sets of jumper pins.

The top set of pins at P4, labeled JUMP1, is used to set the control for Heating or Cooling mode. The bottom set of pins, labeled JUMP2, is used to establish Setpoint at cut-in or at cutout. See Figure 12.

To position a jumper in the Installed position, place the jumper on both pins. To position a jumper in the Removed position, place the jumper on only one pin. (Save the jumper in case it is required in the future.) See Figure 12.

Position the jumpers as follows. Refer to Figure 12, Figure 13, and Table 2.

1. Verify that all power sources to the A419 control have been disconnected.
2. Remove the control's cover by loosening the four captive cover screws.
3. Position the jumpers to set Cooling/Heating, Setpoint, and Touchpad Lock functions.
4. Replace the cover and fasten in place with the four screws.
5. Restore power to the control.

IMPORTANT: Verify that the Cooling/Heating jumper is positioned properly before powering the A419 control, to ensure that the relay operates as intended. See Figure 13 and Table 2.

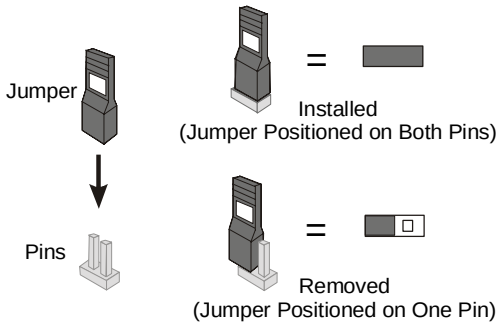


Figure 12: Positioning the Jumpers

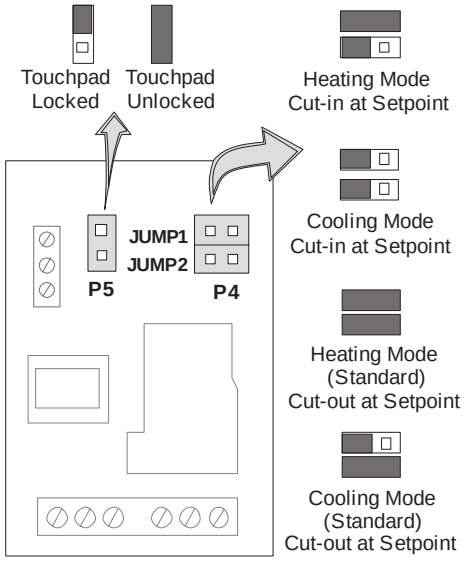


Figure 13: Jumper Positions and Control Settings

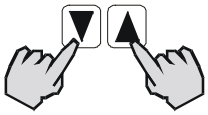
Table 2: Jumper Designations, Jumper Positions and Control Settings

Function	Jumper Pins Designation on Control	Setting	Jumper Position*	Factory Default Setting (and Jumper Position)
Operating Mode Cooling/Heating	**JUMP1** (Top Pair of Pins on Block P4)	Cooling	Removed	Cooling (Removed position)
		Heating	Installed	
Setpoint	**JUMP2** (Bottom Pair of Pins on Block P4)	At Cut-in	Removed	Cut-in (Removed Position)
		At Cut-out	Installed	
Touchpad Lock	**P5**-Touchpad Unlock	Locked	Removed	Unlocked (Installed Position)
		Unlocked	Installed	

Note: The touchpad cannot be unlocked without a jumper. Do not discard any jumpers in case they are required in the future.

Changing Temperature Units

The A419 control is set at the factory to display in Fahrenheit temperature units.



To convert to Celsius units, press the **Up** and **Down** buttons simultaneously. Press them again to return to Fahrenheit units.

Notes: Make sure the Touchpad Lock jumper is in the unlocked (installed) position before adjusting the control. See Figure 13.

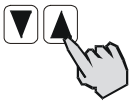
Verify that the A419 control is displaying the desired temperature units (F° or C°) before establishing the setpoint value.

Setting the Setpoint

To view and adjust the temperature setpoint, follow these steps and refer to Table 3:

1. Press and hold the **MENU** button until the display changes to flashing **SP**. This will take about 2 seconds.

2. Press the **MENU** button again. The current setpoint is displayed.



3. Press the **Up** or **Down** button to adjust the setpoint temperature.

4. Press the **MENU** button to save. The display then returns to the sensor temperature.

Notes: If no entries are made for 30 seconds while programming is in progress, the control reverts to the normal temperature display.

If the **MENU** button is not pressed after changing the setpoint value, the new value is not saved and the A419 control reverts to the previously saved setpoint value.

Any **saved** A419 control setting values are **non-volatile** and remain in the control's memory during power interruptions.

Table 3: Function Ranges and Settings

Function	Range	Factory Setting
***SP*: Setpoint**	-30 to 212°F (-34 to 100°C)	30
***dIF*: Differential**	1 to 30° (F or C)	5
***ASd*: Anti-short Cycle Delay**	0 to 12 minutes	1
***OFS*: Temperature Offset**	0 to 50° (F or C)	0
***SF*:Sensor Failure Operation**	0 = output de-energized 1 = output energized	1

Operation at Extremes: If the combination of setpoint plus or minus the differential falls outside the temperature range (-30 to 212°F [-34° to 100°C]), the A419 control operates as follows:

Cooling/Cut-in: If the control is operating in Cooling/Cut-in mode and setpoint minus differential is less than -30°F, the control switches on at setpoint and off when the temperature drops below -30°F (-34°C).

Heating/Cut-in: If the control is operating in Heating/Cut-in mode and setpoint plus differential is greater than 212°F (100°C), the control switches on at setpoint and off when the temperature exceeds 212°F (100°C).

Cooling/Cutout: If the control is operating in Cooling/Cutout mode and setpoint plus differential is greater than 212°F (100°C), the control switches on when the temperature exceeds 212°F (100°C) and off at setpoint.

Heating/Cutout: If the control is operating in Heating/Cutout mode and setpoint minus differential is less than -30°F (-34°C), the control switches on when the temperature drops below -30°F (-34°C) and off at setpoint.

Setting Other Functions

To set the Differential (dIF), Anti-short Cycle Delay (ASd), Temperature Offset (OFS), or Sensor Failure (SF) operation, use the method illustrated and outlined below.

Figure 14 illustrates the order of functions shown using the Up or Down button. The Up button accesses functions in the clockwise direction; the Down button accesses functions in the counterclockwise direction. Refer to Table 3 for function ranges and factory settings.

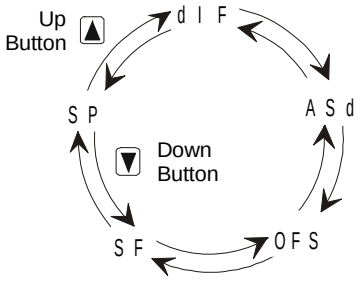
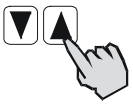


Figure 14: Order of the Functions

1. Press and hold the **MENU** button until the display changes to flashing **SP**. This will take about 2 seconds.



2. Press the **Up** or **Down** button repeatedly until the desired function is displayed. See Table 3.

3. Press the **MENU** button to display the function's current value.

4. Press the **Up** or **Down** button until the desired value is displayed.

5. Press the **MENU** button to save the new value. The display then returns to the sensor temperature.

Notes: If no entries are made for 30 seconds while programming is in progress, the control reverts to the normal temperature display.

If the **MENU** button is not pressed after setting a new value, the new value is not saved and the A419 control reverts to the previously saved value for that function.

Any **saved** A419 control setting values are **non-volatile** and remain in the control's memory during power interruptions.

Checkout

Before applying power, make sure installation and wiring connections are according to job specifications. After necessary adjustments and electrical connections have been made, put the system in operation and observe the control for at least three complete operating cycles before leaving the installation.

Troubleshooting

If the control system does not function properly, verify that the unit is wired, configured, and set properly. If the problem persists, use the following procedures to determine the cause of the problem:

1. Check for proper supply voltage to the A419 control.

   a. Remove the cover by loosening the four captive cover screws.

> **WARNING: Risk of Electrical Shock.**
> High voltages may be present at electrical terminals and other exposed internal metal surfaces. Avoid contact with all metal surfaces on control when cover is removed.

   b. Use a reliable AC voltmeter to check the voltage between the **COM** and **120V** or **240V** terminals on line voltage models and the two 24V terminals on low-voltage models. Refer to Figure 9, Figure 10, and Figure 11.

   c. The voltage must be between: 20 and 30 VAC for 24 volt applications, 102 and 132 VAC for 120 volt applications, 177 and 264 VAC for 208/240 volt applications

   Notes: If the voltage reading is within the required range, proceed to Step 2.

   If the voltage reading is **not** within the required range, check the power source and input power wires for problems.

2. Check for proper sensor operation.

Disconnect all power sources to control.

a. Take a temperature reading at the sensor location, using an accurate thermometer.

b. Disconnect the sensor from the control.

c. Use a reliable ohmmeter, to measure the resistance across the two sensor leads while the sensor is at the temperature taken in Step b.

d. Refer to Figure 15 to verify that the measured temperature and resistance conform to established temperature and resistance values.

e. If the measured values conform to the values in Figure 15, proceed to Step 3.

f. If the sensor's measured resistance value is substantially different from the expected value for that temperature, check the sensor wiring. If sensor wiring is okay, replace the sensor.

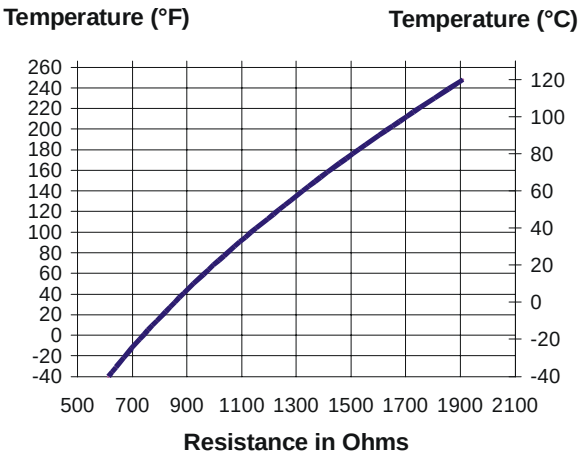


Figure 15: Nominal Temperature vs. Sensor Resistance

3. Check the A419 for proper operation.

a. Perform *Troubleshooting* Steps 1 and 2 before performing this step.

b. Disconnect the load from the output relay terminals.

c. Ensure that the Touchpad Lock jumper is installed, so that the touchpad is unlocked.

d. Reconnect the sensor leads and supply power to the control.

e. Replace the cover.

f. Check the control settings for proper values.

g. Press and hold the **MENU** button until Setpoint appears (occurs in about 2 seconds).

h. Use the **Up** and **Down** buttons to change the Setpoint temperature above and below the current sensor temperature until the output relay energizes and de-energizes as shown in Table 4.

If the anti-short cycle delay has a time greater than 0 minutes, the relay will not energize until the timed delay has elapsed.

i. If the output relay does **not** perform as indicated in Table 4, replace the A419 control.

j. If proper operation of the A419 control is verified, reconnect the load and consult the equipment manufacturer's instructions for troubleshooting the controlled equipment.

Table 4: A419 Output Relay Operation

Setpoint Mode	Operating Mode	Output Relay Energized at…	Output Relay De-energized at…
Cutout	Cooling	Setpoint plus differential	Setpoint
	Heating	Setpoint minus differential	Setpoint
Cut-in	Cooling	Setpoint	Setpoint minus differential
	Heating	Setpoint	Setpoint plus differential

Note: When the relay is energized, the N.O. contacts are closed and the LED is illuminated.

Fault Codes

A419 controls are programmed to display certain fault codes on the LCD as described in Table 5.

Table 5: Fault Codes Defined

Fault Code	Definition	System Status	Solution
SF flashing alternately with OP	Open temperature sensor or sensor wiring	Output functions according to the selected sensor failure mode (SF setting)	See *Troubleshooting* section. Cycle power to reset the control.
SF flashing alternately with SH	Shorted temperature sensor or sensor wiring	Output functions according to the selected sensor failure mode (SF setting)	See *Troubleshooting* section. Cycle power to reset the control.
EE	Program failure	Output is off	Reset the control by pressing the Menu button. If problems persist, replace the control.

Repairs and Replacement

Do not attempt to repair or recalibrate the A419 Control. In case of a defective or improperly functioning control, contact your nearest Authorized Johnson Controls/PENN® Distributor or Sales Representative.

When contacting your Johnson Controls/PENN distributor, have the model number of the control available. This number can be found on the label inside the cover of the control.

Ordering Information

Refer to Table 6 to order controls and accessories.

Table 6: Ordering Information

Product Code Number	Item	Description
A419ABC-1C	**Line Voltage, NEMA 1 Enclosure** A419 Series Electronic Temperature Control with Display, A99 Sensor Included	Supply Voltage: 120 or 240 VAC Range: -30 to 212°F (-34 to 100°C) Differential: 1 to 30F° (1 to 30C°) Sensor Lead Length: NEMA 1 Models 6-1/2 ft (2 m), NEMA 4X Models 9 in (0.25 m)
A419AEC-1C	**Line Voltage, NEMA 4X Enclosure** A419 Series Electronic Temperature Control with Display, A99 Sensor Included	
A419GBF-1C	**24 VAC, NEMA 1 Enclosure** A419 Series Electronic Temperature Control with Display, A99 Sensor Included	Supply Voltage: 24 VAC, Class 2 Range: -30 to 212°F (-34 to 100°C) Differential: 1 to 30F° (1 to 30C°) Sensor Lead Length: NEMA 1 Models 6-1/2 ft (2 m), NEMA 4X Models 9 in (0.25 m)
A419GEF-1C	**24 VAC, NEMA 4X Enclosure** A419 Series Electronic Temperature Control with Display, A99 Sensor Included	
A99BB-200C **A99BA-200C** **A99BB-25C**	Replacement Temperature Sensors	PTC Sensor with 6-1/2 ft (2 m) Leads PTC Sensor with 6-1/2 ft (2 m) Shielded Leads PTC Sensor with 9 in (0.25 m)
BKT287-1R **BKT287-2R** **PLT344-1R**	Accessory Mounting Hardware	12 in. (305 mm) long DIN Rail 36 in. (914 mm) long DIN Rail Two End Clamps for DIN Rail Mounting
CLK350-2C	Digital Clock	7-Day Programmable Digital Clock for controlling Temperature Offset Function
WEL11A-601R	Immersion Well	Immersion Well for applying sensor in fluid applications

Technical Specifications

Product	A419 Series Electronic Temperature Controls with NEMA 1 General Purpose or NEMA 4X Watertight, Corrosion-Resistant Enclosures			
Setpoint Range	-30 to 212°F (-34 to 100°C)			
Differential Range	1 to 30F° (1 to 30C°)			
Supply Voltage	**24 VAC, 60 Hz, Class 2:**	A419GBF-1 (NEMA 1 Enclosure Model) A419GEF-1 (NEMA 4X Watertight Enclosure Model)		
	120 or 240 VAC, 60 Hz:	A419ABC-1 (NEMA 1 Enclosure Model) A419AEC-1 (NEMA 4X Watertight Enclosure Model)		
Power Consumption	1.8 VA Maximum			
Output Relay Contacts Electrical Ratings	**24 VAC Models:**	A419GBF-1 (NEMA 1 Enclosure) A419GEF-1 (NEMA 4X Watertight Enclosure) 100 VA, 30 VAC maximum, Class 2		
	120/240 VAC Models:	A419ABC-1 (NEMA 1 Enclosure) A419AEC-1 (NEMA 4X Watertight Enclosure)		
	Applied Voltage:	**120 VAC**	**208 VAC**	**240 VAC**
	Horsepower N.O. (N.C.):	1 (0.25) hp	1 (0.33) hp	1 (0.5) hp
	Full Load Amperes N.O. (N.C.):	16 (5.8) A	9.2 (4.0) A	8.0 (4.9) A
	Locked Rotor Amperes N.O. (N.C.):	96 (34.8) A	55.2 (24) A	48 (29.4) A
	Non-inductive Amperes N.O. (N.C.):	15 (10) A	10 (10) A	10 (10) A
	Pilot Duty:	125 VA (N.O. contacts) @ 24 to 240 VAC 125 VA (N.C. contacts) @ 120 to 240 VAC 50 VA (N.C. contacts) @ 24 VAC		
Sensor Type	A99BB Type PTC Sensor (See Table 6)			
Control Ambient Temperature	Operating: Shipping:	-26 to 140°F (-32 to 60°C) -40 to 185°F (-40 to 85°C)		
Ambient Humidity	0 to 95% RH Non-condensing; Maximum Dew Point: 85°F (29°C)			
Control Material	Case and Cover:	NEMA 1 High-Impact Thermoplastic NEMA 4X Watertight, Corrosion-Resistant, High-Impact Noryl® Thermoplastic		
Agency Listings	UL: File E27734; CCN's XAPX (US), XAPX7 (Canada) FCC: CFR 47, Part 15, Class A. DOC, Class A			

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, contact Application Engineering at 1-800-275-5676. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

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